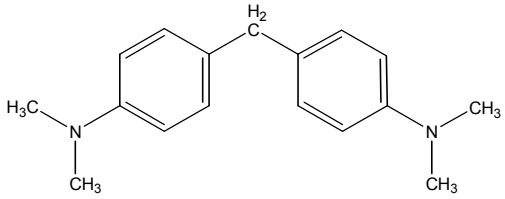
4,4′-METHYLENEBIS(*N,N*-DIMETHYL)BENZENAMINE
CAS No. 101-61-1
First Listed in the *Third Annual Report on Carcinogens*



CARCINOGENICITY

4,4′-Methylenebis(*N,N*-dimethyl)benzenamine is *reasonably anticipated to be a human carcinogen* based on sufficient evidence of carcinogenicity of in experimental animals (NCI 186, 1979). When administered in the diet, the chemical induced hepatocellular adenomas and carcinomas in mice of both sexes and thyroid follicular cell adenomas and carcinomas in rats of both sexes (NCI 186, 1979). An IARC Working Group considered the evidence limited for the carcinogenicity of this chemical in experimental animals (IARC V.27, 1982). In view of a NCI/OTA correlative interpretation, the evidence may be regarded as sufficient (OTA, 1981; Griesemer & Cueto, 1980).

There are no data available to evaluate the carcinogenicity of 4,4′-methylenebis(*N,N*-dimethyl)benzenamine in humans.

PROPERTIES

4,4′-Methylenebis(*N,N*-dimethyl)benzenamine, commonly known as Michler's base, occurs as yellow leaflets. It is insoluble in water and soluble in benzene, acids, diethyl ether, and carbon disulfide. It is slightly soluble in cold alcohol, but more soluble in hot alcohol. When heated to decomposition, it emits toxic fumes of nitrogen oxides (NO_x).

USE

4,4′-Methylenebis(*N,N*-dimethyl)benzenamine is used primarily as an intermediate in dye manufacture and an analytical reagent in the determination of lead. The Society of Dyers and Colourists reported that six dyes and one pigment can be prepared from Michler's base; in 1979, only one of the dyes, Basic Yellow 2, was produced commercially by two companies (Sittig, 1985). 4,4′-Methylenebis(*N,N*-dimethyl)benzenamine has been used as an antioxidant in greases and oil (CHIP, 1981a).

PRODUCTION

The USITC reported that two United States companies produced an undisclosed quantity of 4,4′-methylenebis(*N,N*-dimethyl)benzenamine from 1979 to 1986 (USITC, 1986). From 1975 to 1978, USITC reported that three United States companies produced this chemical with a reported production of 998,000 lb in 1977 (USITC, 1977; USITC, 1978). The 1979 TSCA Inventory identified two companies producing 550,000 lb of this chemical in 1977. There were

two importers with no volume reported. The CBI Aggregate was between 1 million and 100 million lb (TSCA, 1979). Commercial production of this chemical in the United States began about 1921 (IARC V.27, 1982).

EXPOSURE

The primary routes of potential human exposure to 4,4′-methylenebis(*N,N*-dimethyl)benzenamine are inhalation and dermal contact. The potential for exposure to this chemical is greatest among workers in the dye and chemical manufacturing industries. The National Occupational Hazard Survey, conducted by NIOSH from 1972 to 1974, estimated that 1,563 workers were possibly exposed to this chemical in the workplace (NIOSH, 1976). Although the compound is relatively nonvolatile, there is a potential for inhalation exposure to dust in the workplace. Skin contact with 4,4′-methylenebis(*N,N*-dimethyl)benzenamine may also occur, and it is possible that consumers using products colored with these dyes may be exposed to unknown quantities of the compound. According to CPSC, residual levels of the chemical may be present in the final consumer products. Exposure even to trace amounts of 4,4′-methylenebis(*N,N*-dimethyl)benzenamine may be a cause for concern; however, data describing the actual levels of impurities in the final product are not currently available (Sittig, 1985; CHIP, 1981a). The Toxic Chemical Release Inventory (EPA) listed two industrial facilities that produced, processed, or otherwise used 4,4′-methylenebis(*N,N*-dimethyl)benzenamine in 1996 (TRI, 1996). In compliance with the Community Right-to-Know Program, the facilities reported releases of 4,4′-methylenebis(*N,N*-dimethyl)benzenamine to the environment which were estimated to total 1 lb, which was solely attributed to total air release. The compound has been found in samples from 4 of the 1,350 NPL hazardous waste sites (ATSDR, 1994g).

REGULATIONS

EPA has proposed to regulate 4,4′-methylenebis(*N,N*-dimethyl)benzenamine under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and Resource Conservation and Recovery Act (RCRA). EPA has solicited comments on establishing a reportable quantity (RQ) for this chemical under CERCLA. EPA has also proposed subjecting this chemical to reporting/ recordkeeping requirements under RCRA. EPA regulates 4,4′-methylenebis(*N,N*-dimethyl)benzenamine under the Superfund Amendments and Reauthorization Act (SARA) subjecting it to reporting requirements if threshold amounts are reached. Under the Toxic Substances Control Act (TSCA), EPA requires that manufacturers provide data on production, use, and processing of this chemical. OSHA regulates 4,4′-methylenebis(*N,N*-dimethyl)benzenamine under the Hazard Communication Standard and as a chemical hazard in laboratories. Regulations are summarized in Volume II, Table B-81.